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Statistical Units in National Accounts

Statistical Units: Theory and Practice

Prepared by Australian Bureau of Statistics

Summary

      In order to produce the expected suite of economic statistics, national statistical offices need to maintain registers of statistical units on both a production and an ownership (institutional units) basis. In most developed countries, the starting point for creating both of these registers is administrative data where units are based on a legal entity concept. This document will discuss how the Australian Bureau of Statistics creates and maintains its register of statistical units, including managing the relationship with the custodian of the administrative dataset. Finally, the document will discuss plans the Australian Bureau of Statistics has to use its business register to extract more value from administrative data including to meet growing demand for unit and fine level analysis.

I. Introduction

1.   A well-designed economic units model underpinning the design of a statistical business register plays a central role in satisfying the need to harmonise individual surveys and administrative collections that provide the data sources required for a national program of economic statistics. If a model of statistical economic units is to meet user requirements, it should also reflect both the prevailing international statistical standards set out in the 2008 System of National Accounts (SNA) and the manner in which businesses operate within the economic territory concerned.

2.   The United Nations Statistical Division (2007) states, *"The most convenient way to obtain statistical data would be to collect them for entities for which complete sets of required records are available. This would allow statisticians to take advantage of information from the accounting records of the producing entities and from administrative sources related to them. It would also result in statistics that, to a certain degree, serve best the interests of users because it makes it possible to relate administrative records to statistical surveys."* It follows that in most developed countries, a strong administrative dataset of legal entities has served as the foundation of such registers.

3.   In an ideal world, business and government reporting structures would be perfectly consistent with SNA concepts, facilitating the simple conversion of administrative datasets into internationally comparable statistical assets. In practice, this alignment does not occur.

4.   In the late 1990's, Australia was in the process of designing a new system of taxation and associated business reporting, which was implemented during the period 2000 to 2002. There were two main parts to the taxation reform. The first covered the removal of a range of wholesale sales taxes and the introduction of a Value Added tax known as the Goods and Services Tax (GST). The second covered the introduction of the Australian Business Register (ABR), whereby organisations providing or planning to provide goods and services register with the ABR and receive an Australian Business Number (ABN)[1].

5.   The ABR, which has been set up and maintained by the Australian Taxation Office (ATO) provides the most comprehensive administrative listing of Australian businesses. The ABS worked with the ATO in the reforms and established a new economic units model (or Units Model) in 2002 which would complement changes in the taxation system to take advantage of the ABR as foundation for a statistical business register. This Units Model was further refined in 2013 to the form presented in this document. The 2013 revision introduced the location unit, abolished the Australian Enterprise unit and redefined the relationship between Legal Entity (LE) and Type-of-Activity Unit (TAU).[2]

6.   The ABS has embarked on a Transformation program of its economic statistics, as part of a wider organisational transformation program, for which it has received an additional A$250million from Government. At its core, the program aims are to reduce the risk of error in statistics, improve efficiency, improve timeliness, reduce red tape and position the ABS to undertake expanded activity. A key outcome is a redevelopment of the ABS Statistical Business Register (ABSBR) to go beyond its traditional role of providing survey frames to providing a central 'spine' for linking data, including data collected from

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[1] The Australian Business Number (ABN) is a unique 11 digit identifier issued to all entities registered in the Australian Business Register (ABR). The ABR is a whole of government resource located within the Australian Taxation Office. Only registered organisations are eligible to participate in the GST system and able to claim GST credits.

[2] It should be noted that the definition of the enterprise unit in the 2002 ABS Units Model was not the same as the 2008 SNA definition. These terms are further defined in section B.

outside of ABS collections. The Units Model is the conceptual framework that underpins the ABSBR. There are no plans to further refine the Units Model.

7.   This document will discuss how the ABS creates and maintains its register of statistical units, including managing the relationship with the underlying custodian of the administrative dataset and how this fits in with the design of its Units Model. Finally, the document will discuss plans the ABS has as part of the Transformation program to use its business register to extract more value from administrative data including to meet emerging demand for unit based and fine level analysis.

II.   The ABS Economic Units Model[3]

8.   The Units Model used by the ABS in describing the statistical structures of businesses is consistent with Australia's Corporations Act (2001) and with the definition of institutional units recommended by the 2008 SNA. The model consists of four statistical units:

- The Enterprise Group (EG)

- One or more LEs

- One or more TAUs[4]

- One or more locations.[5]

The EG and LE are institutional units and the TAU and Location are producing units.

9.   The LE and the TAU are the main institutional and producing units used by the ABS to produce statistical outputs. They do not have a universal relationship with each other, e.g. one to one, one to many, many to one.

10.   This is a limited departure from the 2008 SNA, which states that there should be a hierarchical relationship between institutional and producing units. In the 2008 SNA the enterprise (the producing view of an individual institutional unit) can be partitioned into one or more kind-of-activity units.[6] The 2008 SNA statement holds in Australia at the EG level, but not necessarily at the LE level.
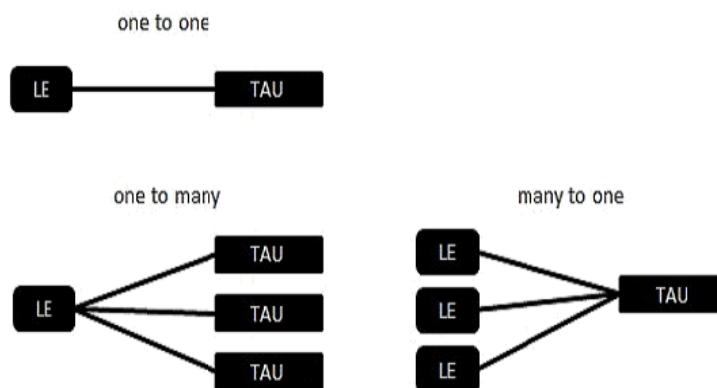
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[3] This section is adapted from ABS Cat. No. 1219.0 – Australian and New Zealand Standard Industrial Classification (ANZSIC), 2006 (version 2.0).

[4] This is very similar to the Kind-of-Activity Unit referred to in SNA 2008, Chapter 5.

[5] The location unit was not defined in the Units Model prior to the 2013 revision.

[6] See SNA 2008, paragraph 5.12

Diagram 1
Legal Entity to Type of Activity Unit relationship

11.   The LE covers all the operations in Australia of an entity which possesses some or all of the rights and obligations of individual persons or corporations, or which behaves as such in respect of those matters of concern for economic statistics. Examples of legal entities include companies, partnerships, trusts, sole (business) proprietorships, government departments and statutory authorities. It has the attributes of the SNA institutional unit. In practical terms, the LE is generally the ABN registrant.

12.   The EG is an institutional unit covering all the operations within Australia's economic territory of legal entities under common control. Control is identified if a parent company has the capacity to determine the outcome of decisions about a LE's financial and operating policies.[7]
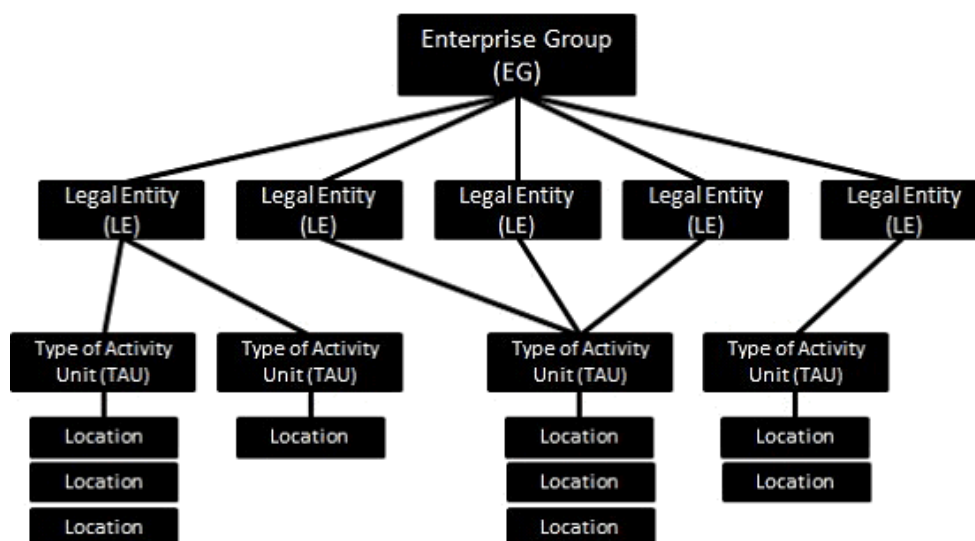
13.   The producing unit in the ABS Units Model is the TAU. The TAU comprises aggregated or disaggregated LEs within an EG that can report productive and employment activities via a minimum set of data items, which are:

- Total capital expenditure;

- Income from the sale of goods and services;

- Wages and Salaries;

- Total Inventories; and,

- Total purchases and selected expenses.

14.   A TAU can also be formed in situations where only some data items are available directly from accounts and good quality estimates can be provided. Diagram 2 below depicts the relationships between these unit types.

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[7] In accordance with Australia's Corporations Act 2001, Section 50AA.

Diagram 2
ABS Units Model

15.   The activity of the TAU is designed to be as homogeneous as possible, as per SNA guidance for forming kind-of-activity units.[8] Ideally, all TAUs are constructed so that two-digit level (Subdivision) of the Australian and New Zealand Standard Industrial Classification (ANZSIC) homogeneity is observed. This ensures that good quality industry estimates can be calculated by the ABS at that level. However, not all businesses are able to supply a complete set of accounts for every ANZSIC Subdivision in which they have activity. Where a business cannot supply adequate data to form a TAU for an individual ANZSIC Subdivision, a TAU may be formed which contains activity in two or more ANZSIC Subdivisions.

16.   A Location aligns with the SNA definition of the establishment, or local KAU.[9] It is a single, unbroken physical area, occupied by an organisation, at which or from which, the organisation is engaged in productive activity on a relatively permanent basis, or at which the organisation is undertaking capital expenditure with the intention of commencing productive activity on a relatively permanent basis at some time in the future. The exception is the agricultural location unit (farm unit) where land parcels are operated as a single property and are treated as a single location.

17.   The location statistical unit will not be populated in the existing version of the ABSBR, but will be addressed under transformation. An administrative data source has been identified and work is currently underway to source additional supplementary datasets.

18.   Various classifications are applied to the units in the ABS Units Model. The main classifications applied are:

- ANZSIC for Industry[10]

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[8] See SNA 2008, paragraph 5.12

[9] See SNA 2008, paragraph 5.14

[10] A concordance to the ISIC Rev 3.1 is contained in Chapter 10 of the ANZSIC, ABS Cat. No. 1292.0

- Type of Legal Organisation (TOLO)

- Type of Business Entity (TOBE) for the type of entity

- Standard Institutional Sector Classification of Australia (SISCA) for institutional sector and the public/private flag.

19.   ANZSIC is used to classify the industry in which the TAU has productive activity. Each unit is assigned a four digit (class level) ANZSIC code which reflects the predominant industry of the TAU's economic activity. SISCA provides a framework for dividing the Australian economy into institutional sectors. These sectors group Legal Entities which have similar economic functions and share similar structural characteristics.

III.   The Australian Business Register

20.   The ABS maintains a statistical register of economically active Australian businesses (ABSBR). This ABSBR is built on the whole of government register of businesses[11] maintained by the Australian Tax Office, known as the Australian Business Register (ABR). A business cannot usually operate in Australia without being listed on the ABR, registration for which includes the issuing of an ABN. Businesses are required to cite this number in all dealings with the Australian government, and with other domestic entities when participating in Australia's value added tax system, the GST. Associated with the ABN on the ABR is a range of further administrative information, including location, ownership, and primary industry under the ANZSIC.[12]

21.   The ABS uses the ABR as its primary source of basic business identity and classification data. The ABS also uses transactional information supplied by the ATO to determine whether the legal entity is actively engaged in production and to update benchmark information. The ABSBR provides the frame for the various business-based economic surveys run by the ABS.
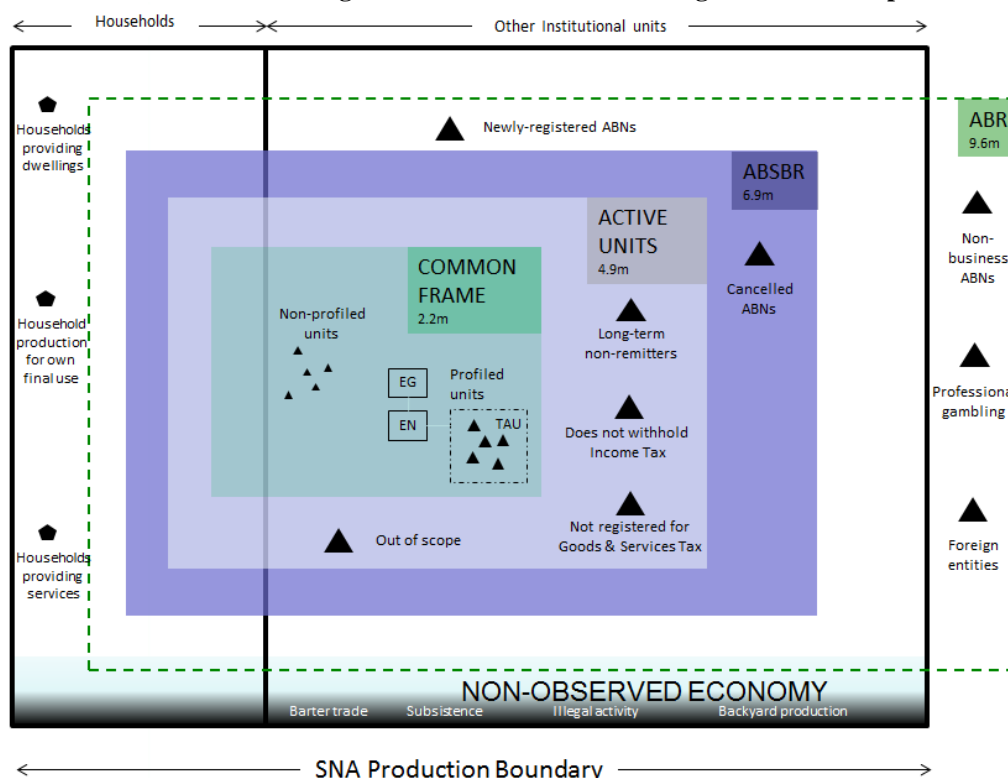
22.   Enterprise groups that are considered sufficiently complex and significant are profiled to create units according to the Units Model. These groups are known as the Profiled population. Direct engagement with these ABN holders allows the ABS to translate corporation structures into statistical units that satisfy the requirements of the National Accounts.

23.   The ABN registrants that are assumed to have simple structures are regarded as single legal entity, single enterprise group and single TAU units. These units are known as the Non-Profiled population. The two populations are mutually exclusive and cover all economically active organisations in Australia, which have registered for an ABN.

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[11] In this context, the definition of a business is intended to include companies, partnerships, trusts, sole proprietorships, government departments and statutory authorities.

[12] The ANZSIC is comparable to the International Standard Industrial Classification of All Economic Activities (ISIC). It was prepared in cooperation with Tatauranga Aotearoa (Statistics New Zealand) as an industrial classification better tailored to our economic territories. A concordance with ISIC version 3.1 is included in Chapter 10 of the ANZSIC publication: ABS Cat. No. 1292.0.

Diagram 3
The Australian Business Register and the ABS Business Register relationship[13]

IV. Relationship with administrative data providers

24.   Maintaining effective relationships with administrative and transactional data providers are essential to the production of economic statistics particularly where they have the potential to enable, complement or substitute for the direct collection of data and increase opportunities for expanding statistical products. The ABS works closely with government agencies and private sector data custodians to optimise the statistical potential of their data.

25.   The relationship with the ATO has a strong foundation, with increasing interaction that spans a wide range of areas and people in both agencies. It enables the sharing of important administrative data from a number of ATO areas with the ABS, as well as extensive collaboration on several data-related fronts, including: data analytics; whole-of-government data acquisition infrastructure; and access to government-held data.

26.   A formal agreement underpins the relationship between the two organisations. The Memorandum of Understanding is an ABS-ATO Head Agreement with six Subsidiary Agreements. This allows for flexible and dynamic collaboration. New subsidiary agreements can be created as needs evolve.

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13 The ABS Common Frame is a point in time snapshot of the ABS Business Register used to create Survey frames for the business-based economic collections.

27.   The ABS has sought to influence business tax reporting to optimise its statistical potential. Sectoral and Industrial classifications for businesses and similar legal entities on the ABR were prepared in accordance with the ABS' established statistical standards in compliance with the 1993 SNA and subsequently with the 2008 SNA. For example, the ABN legislation outlines the concept of undertaking an enterprise which aligns very closely with the SNA concept of production. Likewise, the ABS designed its systems around what the ATO would be able to provide. A large range of ABS surveys can thus draw directly on the administrative data supplied by the ATO without need for significant transformation, especially for the Non-Profiled population. The ABS-ATO partnership has matured over the years. While it commenced primarily as a one way data provision to the ABS, mutual benefit is now a core characteristic of the relationship.

28.   Cooperation between the ABS and ATO remains fundamental to the good upkeep of the ABSBR. The ATO alerts the ABS to new ABN registrants on a monthly basis in order to update the ABSBR. The ABS also uses ATO transactional information to identify businesses actively engaged in production and to update size benchmarks.

29.   The ABR is a whole of government resource maintained by the ATO. The ABS has actively engaged and provided support to the ABR. For example, the ABS has supported recent initiatives by the ABR to introduce point of contact industry coding at the point of registration and to introduce business location information for multi-location businesses.

30.   Point of contact industry coding was introduced in December 2013. During the registration process the registrant is asked to type in a main activity. The registrant is then presented with a list of industry index entries from which they choose the one that best represents their business. The ABS assisted in the design of the coder index via the outposting of four staff to the ABR, and is currently working with the ABR to further improve the index weightings. This development has significantly reduced the number of units that are excluded from ABS survey frames because they have not been able to be either automatically or manually coded to an industry.

31.   The strength and flexibility of the ABS and ATO / ABR relationships will be particularly important as each agency progresses their transformation agendas, while seeking new opportunities through initiatives brought on by the digital economy transformation and a changing data landscape.

V. Challenges and Future Developments

32.   As noted, the Australian government has provided the ABS approximately $250 million over the next five years to undertake a major organisational transformation program.   The transformation of our Economic statistics is an important element of the program.   Historically, the main of the ABS statistical business register (ABSBR) has been the provision of comprehensive and unduplicated survey population frames.   A key feature of our Economic Statistics Transformation is to realise the wider potential of the Business Register as an integrating "spine" for business related data.

33.   In exploring ways to improve the functions of the ABSBR, the requirements for redesign that have emerged are that the ABSBR should rely on a small core of essential business structural information with a linking variable (the ABN) to integrate other information currently included on the ABSBR and other files. Examples of other files could include economy wide transaction data, survey-specific data, profiling information or provider management information. Links to other registers like the ABS Address Register, designed primarily to support social and population statistics will also be facilitated. Given the wide practise of including the ABN in growing range of administrative and transactional data sets, this approach would support the linking of ABS and non-ABS source data files to produce both existing and new statistical series and products.

34.   Successive Australian governments have encouraged the reduction of the 'red tape' that is imposed upon business. For statistical collections, this translates to minimising the number of surveys conducted, as well as the level of detail requested. The ABS' challenge is to find ways to unlock sources of this finer level of data without simply broadening the scope of surveys and imposing new data requests on survey respondent. This aligns with emerging government priorities to "collect once use many times" to make better use of data collected by other government agencies and other administrative sources.

35.   The ABS vision under the transformation program is that its ABSBR will:

(i)   Become the integrating spine for all firm level data, providing a common link to all data about a particular firm to which the ABS has access.

(ii)   Provide the infrastructure for unit and small area statistical products, including the Business Longitudinal Database[14], and by using geospatial data for regional statistics.

(iii)   Become a data source in its own right, as a tool for unit level analysis for ABS analysts, and available to non-ABS researchers for purposes such as unit level analysis and micro-simulation.[15]

36.   These capabilities to interact with a wider range of data sources were not envisaged when the underlying design of the ABSBR was prepared in the mid-1990s.

37.   Profiling of large and complex businesses will continue to be a critical activity to ensure accurate business structures on the ABSBR. As part of the transformation, the ABS will also consolidate the profiling of business register units with the editing of survey data into a single team, to ensure data coherence across collections and more effective stakeholder management outcomes.

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[14] See paragraph 40.

[15] See Ryan, L. et al (2015) for more details.

38.   A significant proportion of economic activity in Australia is undertaken by Enterprise Groups with a presence in more than one economic territory. These multinational entities present challenges for updating the ABSBR and communicating unambiguously the reporting scope to data providers. Increasingly multinationals report to parent corporations on a regional basis and international operations with unusual legal and reporting structures are being created.

39.   This may lead to statistics covering these entities within and between different countries being inconsistent as these multinational entities are surveyed in all countries in which they have "productive" economic activities. The profiling of these entities into adequate statistical units will involve a reconsideration of the statistical units model (Ritzen, 2011). As the challenges in this area are still being resolved internationally, this work remains on the ABS agenda for future research and development.

A.   Integrating spine for firm level data

40.   The transformed ABSBR will be the integrating spine for business-based statistics. There are a small number of collections, which are yet to directly draw their populations from the ABSBR. The ABS has been slowly migrating these economic statistical collections to the ABSBR. The efficiency of this work and the pace of change has been hampered by the need to 'bolt on' additional functionality to hold collection specific variables. This work is particularly labour intensive under the current ABSBR design.

41.   The establishment and maintenance costs of migration to the current ABSBR have been prohibitive and have created a barrier to full integration for some collections. Recently the surveys of International Trade in Services and Tourist Accommodation have migrated to the ABSBR. Migration of the Survey of International Investment is currently underway and the preparatory work will shortly commence for the Survey of Financial Information.

42.   A challenge the ABS faces is the accommodation of institutional sector based collections such as Survey of International Investment and Survey of Financial Information. The TAU unit is not suitable for these collections as they are not measuring production. The LE is also not a suitable unit as investment is usually managed at a higher level of the group. The EG cannot be utilised because National Accounts require institutional sector-based output. The current approach for financial surveys is to create a statistical unit called the SISCA Based Collection Unit (SBCU), which is a grouping of legal entities (ABNs) within an EG, which is homogenous by SISCA (institutional sector). The challenge for the ABS will be to maintain the links between the SBCU and the TAUs to unlock the potential data linking opportunities.

43.   Their integration would greatly enrich the data currently available and would for example open up opportunities to present foreign ownership attributes of Australian production statistics.

44.   Under transformation, the establishment and maintenance costs of migration will be greatly reduced. Work is commencing to specify the infrastructure required by each collection in order to migrate to the transformed ABSBR.

45.   Government units[16] are included on the ABSBR but are not used for the Government Finance Statistics (GFS) collections. The GFS utilises highly consolidated administrative data which is usually at the departmental level. In a recent exercise, the ABSBR units

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[16] Government units are 'legal entities established by political processes that have legislative, judicial or executive authority over other institutional units within a given area". (SNA08, para. 4.117)

covered by GFS reporting have been identified to ensure a single coherent view of the public sector.

B.   Infrastructure for unit and small area statistical products

1.   Point in time and longitudinal Integration

46.   The Business Longitudinal Database tracks a pre-determined sample of units longitudinally for five years to facilitate analysis of micro-drivers of business performance over time. The frame is originally selected from the ABSBR, and data on business performance is updated through an annual Business Characteristics survey. Redevelopments of the ABSBR that allows the integration of results from past collections will enable the creation of an expanded longitudinal datasets from existing collections. Work has already resulted in developing an Expanded Analytical Business Longitudinal Database (EABLD) using the early developments of data-linking principles.[17]

47.   The process undertaken for each of the financial periods included in the EABLD (2001-02 to 2012-13) differs for the ABS non-profiled and profiled population.

48.   For units in the ABS non-profiled population, the ABN is used to integrate the ATO financial information with ABS data collected from the Business Characteristics Survey, Economic Activity Survey and Survey of Research and Experimental Development by Businesses. For units in the ABS profiled population, ATO reported data from all ABNs under a given EG is aggregated to the EG level, and then apportioned across the TAUs within the EG based on employment information. This produces a dataset which contains modelled ATO data for units based on the reporting structures on the ABSBR which is then used to directly link the ABS collected data.

49.   The method used to construct the EABLD supports the integration of ABS business survey data and other administrative data and represents the foundation of a dynamic micro level dataset. Examples of other data that could be integrated are patents, trademarks and designs data and insolvency data sourced from government agencies and research institutions. Integration of the EABLD with the ABSBR would represent a significant step towards the creation of an enduring firm level statistical asset.

50.   The creation of the EABLD has enabled Australia to contribute to two OECD projects: DynEmp[18] and MultiProd[19]. The Australian Department of Industry and Science has used the EABLD to explore the dynamics of employment and productivity growth in Australian firms and the first research paper in a series was published earlier this year. This paper examined the contribution of young firms, particularly start-ups, to net job creation in the Australian economy between 2001-2011.

2.   Geospatial Integration

51.   Using the TAU rather than the Location (or Establishment) as the production unit has served the ABS well in achieving the objective of reducing respondent burden. However, this means that minimal information on locations has been collected. Where

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[17] For more information, refer to ABS (2015) *Information Paper: Construction of the Expanded Analytical Business Longitudinal Database.* The EABLD was a joint project between the ABS and the Australian Department of Industry and Science (DIS).

[18] OECD dynamics of employment project which provides new empirical evidence on the role of employment dynamics to participating country performance.

[19] Micro-drivers of aggregate productivity http://www.oecd.org/sti/Flyer_Multiprod.pdf

regional information has been collected, it is usually limited to the level of the eight Australian States and Territories. This has restricted the capacity to integrate household-based and register-based collections and conduct regional analysis.

52.   There has been increasing demand in recent years for regional data by Australian Government policy analysts. However, the ABSBR is not fully geospatially enabled as the location unit within the Units Model has not yet been populated. The aspiration for a transformed ABSBR will include a register of businesses, structured according to the complete Units Model (including location statistical units), profiling information and mapping to facilitate ABN-TAU linkages.

53.   Holding geospatial data on the ABSBR will, among many other benefits: (i) improve the availability and quality of regional economic business counts; (ii) enable a broader range of regional economic data to become available via modelling and data linkage; and (iii) in the longer term, enable coherent approaches to the production of regional statistics to be developed by facilitating future migration of location based economic collections to the ABSBR.

54.   Work is currently underway to progress the goal of geospatially enabling the ABSBR. This includes:

- A location statistical unit has been added to the Units Model.

- Addition of geospatial functionality to hold location data. This location functionality has the capability to hold address and geography information at the EG, TAU and ABN levels.

- Main business address data was added to the ABSBR using ATO sourced addresses and geocoded using the ABS address coder. This was done for legal entities (ABNs) and identifies main business address. Locations for a multi-location business have not yet been added.

55.   Recently, location data including address, industry and geo-codes has been added to the ABR for all new registrations and through a special exercise for some large businesses. The ABS plans to incorporate this data onto the ABSBR, and the ABS and ABR are working together to explore additional options to source and maintain location level data for both registers.

56.   There are also some conceptual challenges that still need to be addressed. These include handling business locations that are not described by an address (eg. mining locations that do not have roads or offshore exploration locations) or service based businesses where it does not make sense to describe them geographically.[20]

57.   Another recent initiative is the development of an address register for use in Australia's first primarily digital census of population and housing and then as the frame for household surveys. A benefit will be its potential to link economic and household information geospatially. This would allow both the integration of and confrontation with data concerning the labour force, facilitate small-area analysis, and contribute to creating a more outward-looking ABSBR.

C.   Source on its own right

58.   Under the ABS transformation program the ABSBR will have a more central role in the production of economic statistics. The ABSBR will continue to provide the frame for

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[20] See Ioannou, M. et al (2015) for more information.

most economic statistical collections and will play a key role in the integration of an expanded range of economic datasets. It will also become a data source in its own right, as a tool for unit level analysis for ABS analysts, and available to non-ABS analysts for purposes such as unit level analysis and micro-simulation.

59.   An area of further investigation is the potential to derive short term economic indicators directly from ABSBR maintenance dynamics. The ABS produces a publication "*Counts of Businesses Entries and Exits*"[21], which provides annual business demography information based on ABN births and movements in and out of the active population. Research work is underway to model and adjust for the "administrative noise" in the ABR registration process to provide more frequent data on business births and deaths that could provide an early signal of shifts in economic activity.

VI.   Conclusion

60.   There remain a number of challenges faced by NSOs to ensure their registers of businesses reflect the practical reality of how businesses operate. There is a need to review frames and processes and to adapt existing systems to deal with the increasing complex and rapidly changing nature of businesses as well as exploit the richness of both government administrative data and private sector transactional data as a statistical input.

61.   The ABS' organisational transformation program provides an opportunity to review existing practices, including the vision of expanding the role of its ABSBR to be the integrating spine for firm level data. Traditionally, statistical business registers have been designed and used to support statistical surveys and censuses via the provision of survey frames, and as a source for broad business demography outputs. An expanded role for the ABSBR is a central element of the ABS statistical transformation strategy.

62.   This document has set out the key directions of the ABS for its business register. The transformed ABSBR will enable more efficient maintenance procedures and will facilitate enhanced links between administrative datasets and ABS directly collected datasets. It will be geospatially enabled to provide the infrastructure for unit and small area statistical products and potentially become a data source in its own right. This work - along with the aim of opening access to the ABSBR to other organisations - will place the ABS in a position to meet latent demand for micro data analysis to support evidenced based policy development and decision making.

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[21] Refer to ABS (2015) *Counts of Australian Businesses, including Entries and Exits, Jun 2010 to Jun 2014*.

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